6. Specification of DAEWOO Magnetron of 2M218

▶ FCC ID : C5F7NF86MO1ØØØ ◀

DAEWOO
DAEWOO ELECTRONICS CO., LTD.

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MAGNETRON DIVISION

TO :

APPROVAL SIGNATURE

S P E C I F I C A T I O N

FOR
DAEWOO MAGNETRON

2 M 2 1 8

No-Hon Myong

NO-HON MYONG
MANAGER, MAGNETRON DEPT.

SPECIFICATION NO. :
ISSUD :

SEC

2M218

This specification is based upon EIAJ ET-145A Testing Methods for Continuous Wave Magnetrons

DAEWOO CONTINUOUS WAVE MAGNETRON 2M218

DESCRIPTION	Magnetron (Fixed Frequency, Integral Magnet)
FUNCTION	For Microwave Oven (2450MHz Band continuous wave oscillation)
OUTER DIMENSIONS	See Outline drawing

									NOTE(4)(5)	NOTE(4)
ABSOLUTE MAXIMUM RATINGS	TERM	Ef	tk	e bm	Ib	Ibm	Pi	σ L	T p	T case
	UNIT	V	s	kV	mAdc	A	kW	-	℃	℃
	MAX.	3.75	-	4.5	350	1.2	1.4	4	250	100
	MIN.	2.80	0	-	-	-	-	-	-	-
STANDARD TEST CONDITION	NOTE (1)(2)(3)	3.30	-	-	300	-	-	1.1MAX	-	-

TEST SPECIFICATION

TEST TERM NOTE (8)	TEST METHOD EIAJ ET-145A	TEST CONDITION	SYMBOL	BOGIE	LIMIT MIN.	LIMIT MAX.	UNIT
※※※ VIBRATION	5.4.1		-	-	-	-	-
※ BREAK DOWN VOLTAGE	4.2	NOTE (6)	-	-	-	-	-
※ INSULATION	4.2	Eb=1kVdc R.H.MAX.60%	-	-	100	-	MΩ
※ FILAMENT CURRENT	4.1.1	tk=120s	If	10	8	12	A
PEAK ANODE VOLTAGE	4.3.1	NOTE (7)	e bm	4.10	3.95	4.25	kV
AVERAGE POWER OUTPUT(1)	4.3.3.1	NOTE (7)	Po (1)	925	885	965	W
FREQUENCY	4.3.4		f	2458	2448	1468	MHz
※※※ PULLING FIGURE	4.3.6	σ L =1.5	fpl	-	-	15	MHz
※※※ SINK PHASE	4.3.7		λsink/λg	0.25	-	-	-
※ STABILITY MODING (1)	4.3.11.2	σ L =2,3,4;t=60s	-	-	-	-	-
※ FUNDAMENTAL FREQUENCY RADIATION	4.3.15	σ L =4	S 1	-	-	1	mW/cm²
※※※ LIFE TEST	4.5.1		t	-	500	-	h
※※※ LIFETEST END POINT — AVERAGE POWER OUTPUT (1)	4.3.3.1	NOTE (7)	Po (1)	-	710	-	W

NOTE (1) Prescribed R.F.Coupler (Refer to the attached chart) or the similar type must be used.

(2) Forced air cooling (1000 l/min).

(3) Single phase full wave rectifier without filter shall be used for power supply.

(4) See outline drawing for measuring point.

(5) Maximum saturated anode temperature for normal condition (with load in the cavity) should be 200℃.

(6) Eb=10kVdc or 7kVac : t=60s

(7) The surrounding temperature will be settled at the value of 25℃ and it's exchange rate should be -0.002/℃.

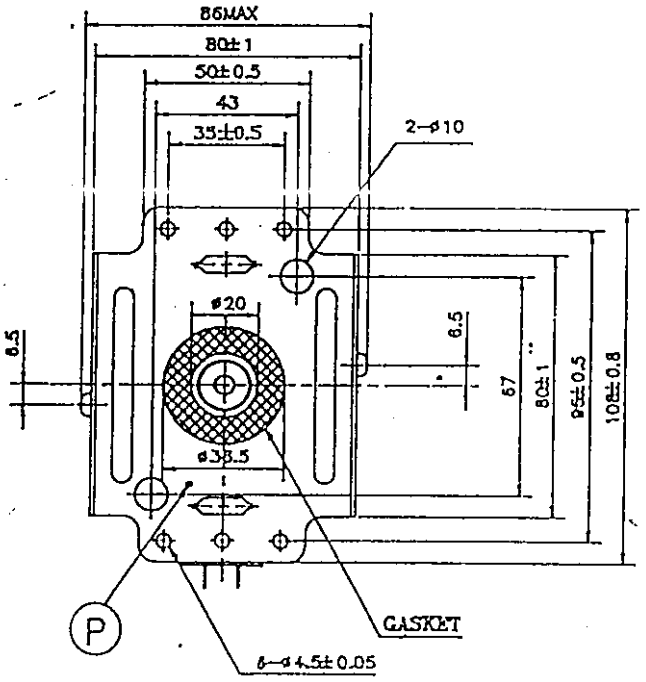
(8) Tests shall be classified as follows.

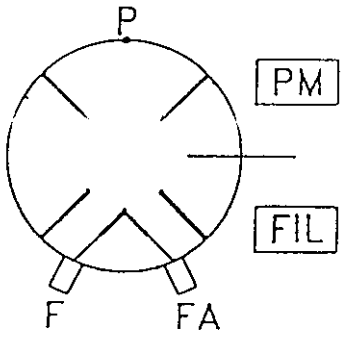
Class	Mark	Remarks
Production test	None	This test is intended to ensure if the production line is being processed in compliance with the standard, and shall be conducted on some typical characteristics which are considered to be affected by changes in the process.
Design test	※	This test is intended to ensure the standard design, and shall be conducted on such characteristics which are not affected by the ordinary production line as long as the design is maintained.
Type approval test	※※	This test is intended to ensure the compliance of the standard design with given specifications, and may be omitted unless a substantial change in the design is made.

2M218

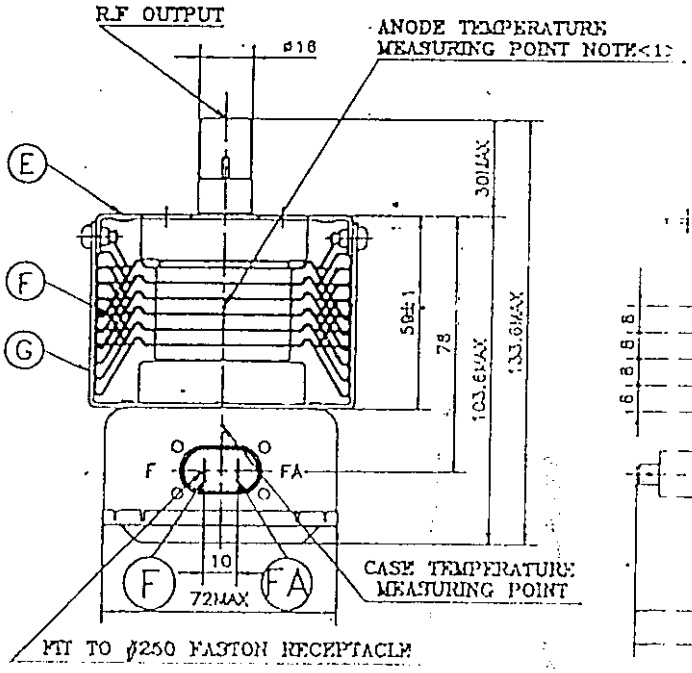
OUTLINE DRAWING

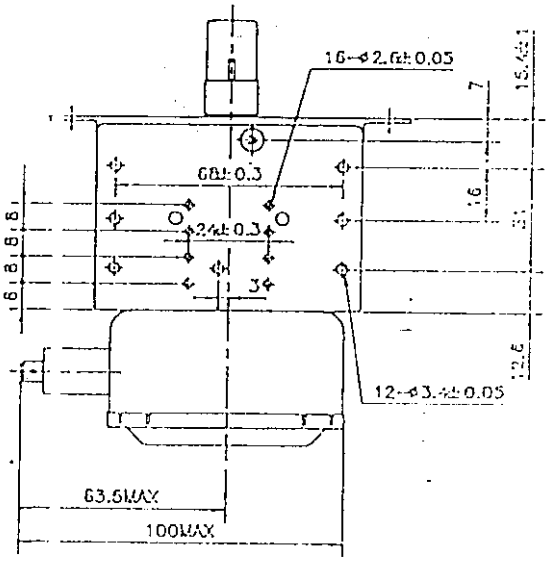
UNIT: mm





NOTE<1> TEMPERATURE TO BE MEASURED AT THE OUTLET SIDE OF AIRFLOW.

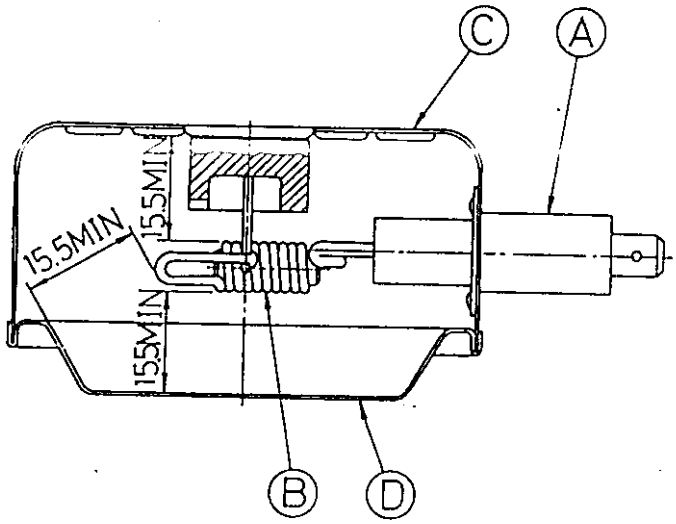


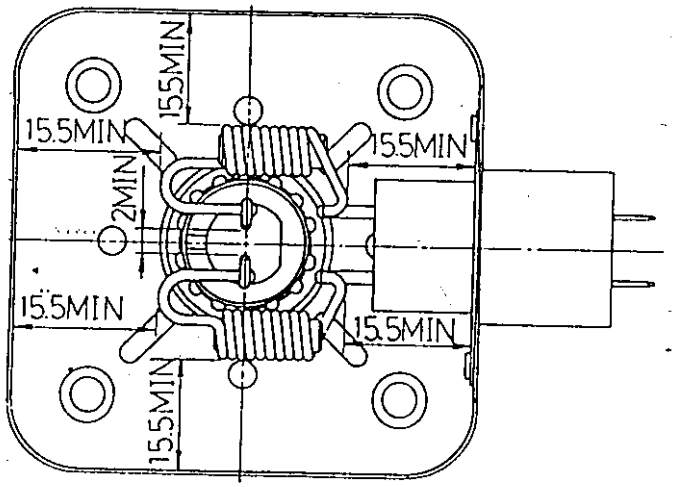


SPEC.NO.:	DATE:	PAGE: 4/10

SPACING IN THE SHIELDING CASE

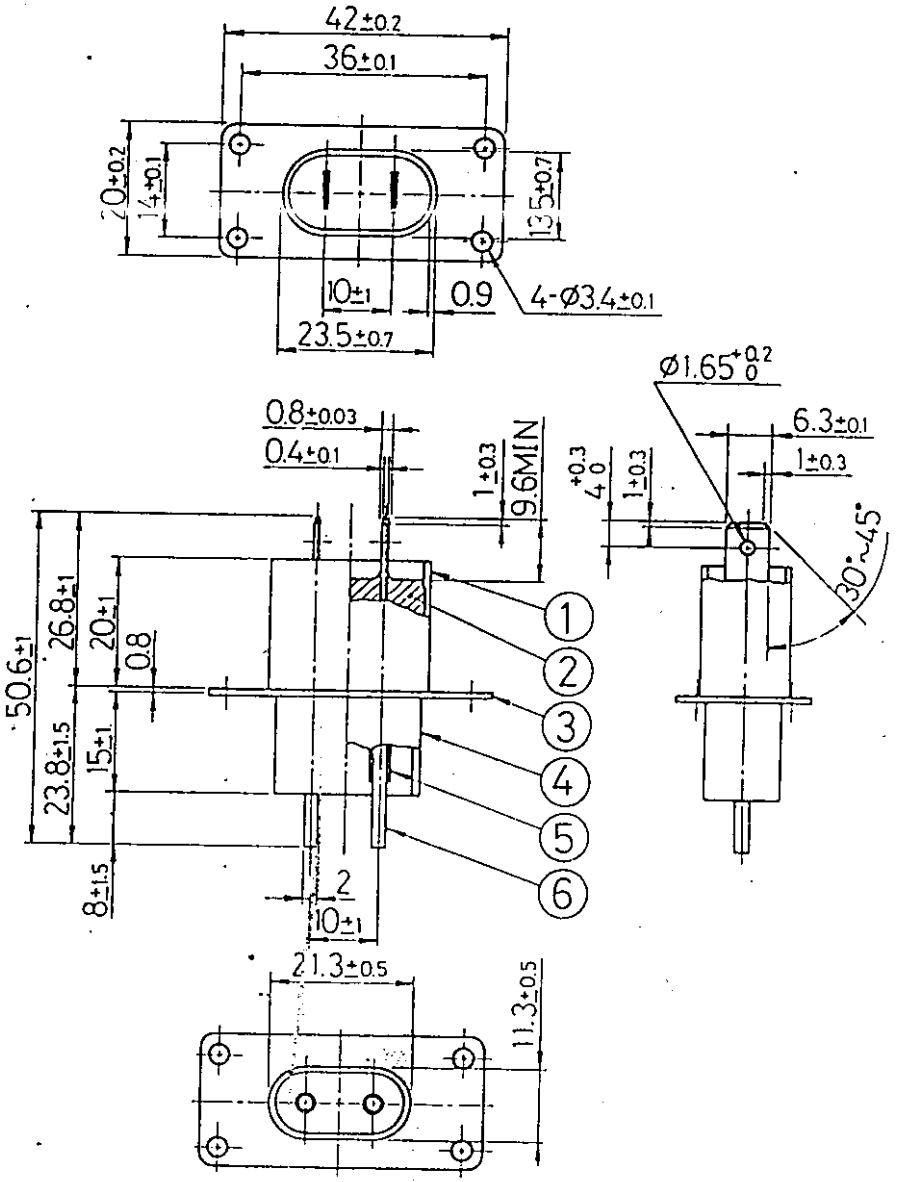
UNIT : mm





DETAILS OF FILTER CAPACITOR

UNIT : mm



NOTE<1> THE FASTON TAB MEETS TO BS 5057 : 1973 AND DIN 46244 : APRIL 1980.

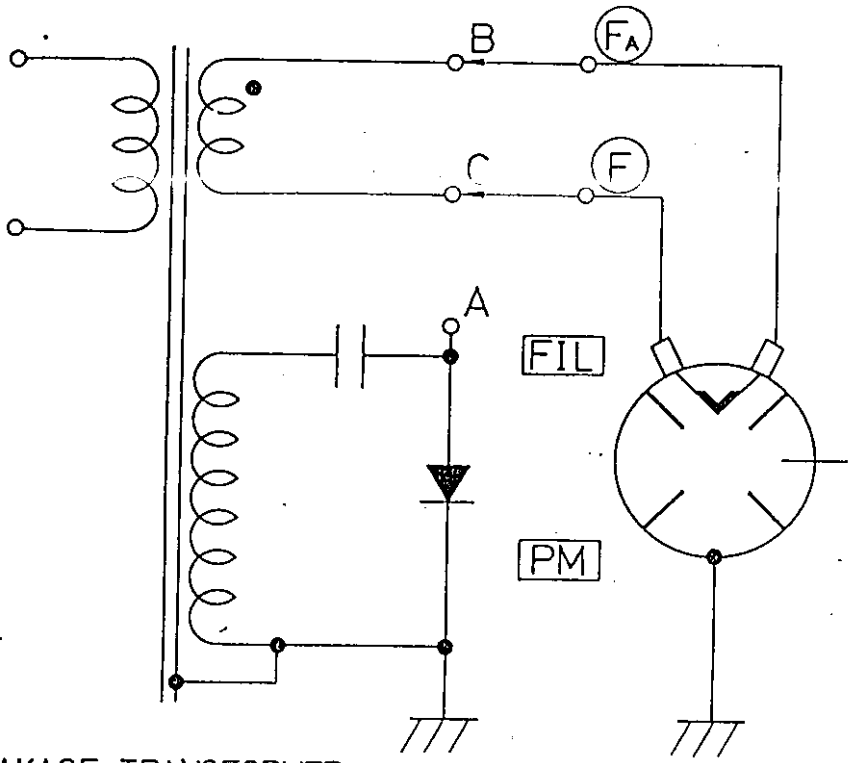
2 M 2 1 8

MATERIAL LIST

	Part name	Manufacturer		Material	Manufacturer of Materials	UL — No. Guide No.	UL — No. File No.	UL — No. Grade No.	Note
A	Capacitor (HFC-2S-1)	TDK Corporation	1	Polybutylene terephthalate	Mitsubishi Rayon Co.,LTD.	QMFZ2	E54695(N)	G2930	
			2	Epoxy Resin	TDK Corporation	-	-	R-2,R-3	
			3	Steel	TDK Corporation	-	-	-	
			4	Polybutylene terephthalate	Polyplastic Co.,LTD.	QMFZ2	E54695(N)	2130	300 V a.c. 6kV10kVdc
			5	Silicone Rubber Tube	Shin-etsu Chemical Co.,LTD. Toshiba Silicone Co.,LTD.	-	-	3609 5053	
			6	Steel	TDK Corporation	-	-	-	

	Part name	Manufacturer	Material	Thickness Diameter (mm)	Size (mm)	Note
B	Choke coil	Dong An Corporation	Ferrite	-	φ5 x 16	9.5 turns 1.5 mH x 2
			Enameled copper wire	φ 1.4		
C	Shielding case	Daewoo Electronics Co.,LTD.	Zinc steel	T 0.4	70 x 70	
D	Shielding case cover	do	do	T 0.4	71 x 71	
E	Heat sink enclosure (1)	do	do	T 0.4	-	
F	Heat sink	do	Aluminium	T 0.7	80 x 80	6 fins
G	Heat sink enclosure (2)	do	Zinc steel	T 1.4	-	

FILAMENT CONECTION

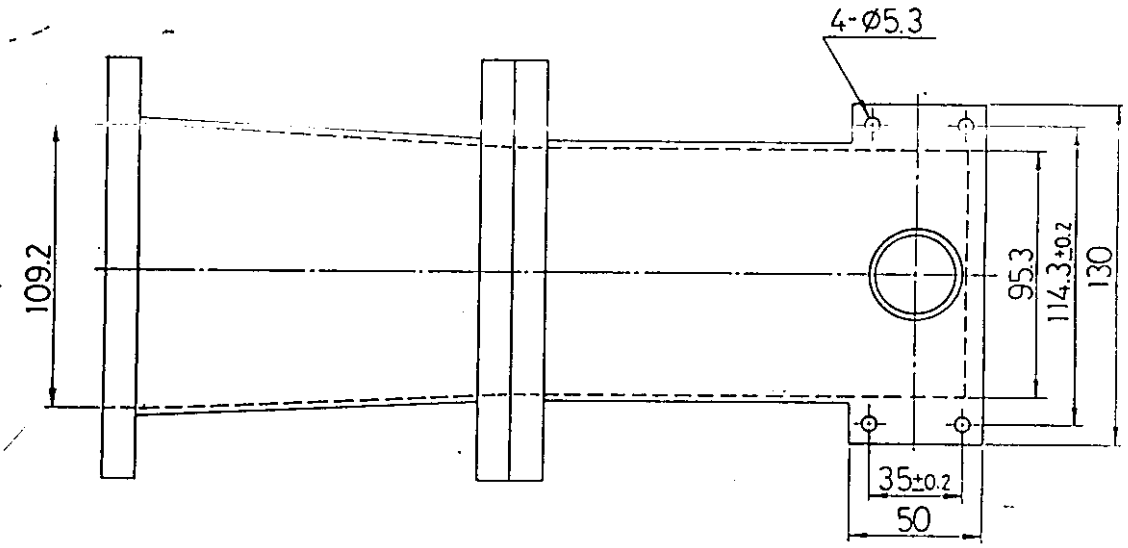


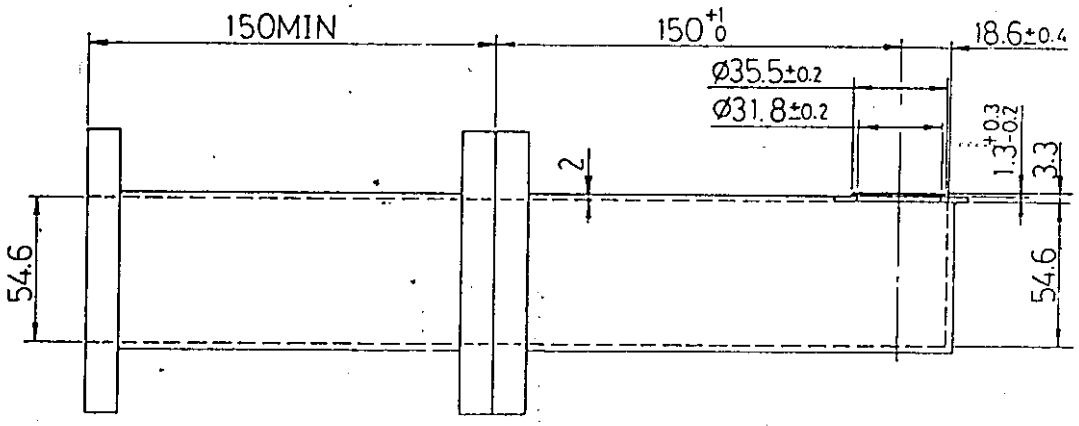
LEAKAGE TRANSFORMER

A WILL BE CONNECTED TO B OR C

R. F. COUPLER

UNIT : mm



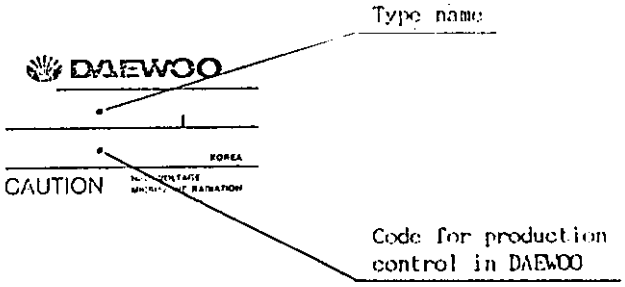


STANDARD R.F. COUPLER DEFINED BY E.I.A.J.

SPEC. NO. :	DATE:	PAGE : 9/10

LABEL

The Label as shown below shall be put on each tube.



7. Specification of TOSHIBA Magnetron of 2M254

▶ FCC ID : C5F7NF86MO1ØØØ ◀

TOSHIBA

TOSHIBA HOKUTO ELECTRONICS CORPORATION
MAGNETRON QUALITY ASSURANCE GROUP, MAGNETRON DIVISION
1975, 23-CHOME MINAMI -5-JODORI, ASAHIKAWA, HOKKAIDO 078, JAPAN
PHONE (0166) 31-8500 FACSIMILE (0166) 31-8209

To : DAEWOO ELECTRONICS CO., LTD.

APPROVAL SIGNATURE

SPECIFICATION

FOR

MAGNETRON

2M254

Yoichi Terabayashi

MANAGER,
MAGNETRON QUALITY ASSURANCE GROUP
MAGNETRON DIVISION

SPECIFICATION NUMBER	:	E960014-D01	January 24 , 1996
REVISION STATUS	:	REVISION A	February 28, 1996
		REVISION B	June 21, 1996
		REVISION C	July 17, 1997
		REVISION D	June 16, 1998

REFERENCE FOR THIS SPECIFICATION
MAGNETRON ENGINEERING DEPARTMENT
1975, 23-CHOME, MINAMI 5-JODORI, ASAHIKAWA, HOKKAIDO 078, JAPAN
PHONE : (0166) 31-4728 FACSIMILE : (0166) 35-5671

MAGNETRON SPECIFICATION

This specification is based on the testing methods for continuous wave magnetrons ED-1501 set by the Electronic Industries Association of Japan (EIAJ).

Continuous Wave Magnetron												
DESCRIPTION	Magnetron (Fixed Frequency, Integral Magnet, Forced Air Cooled)											
FUNCTION	2450 MHz band continuous wave oscillation											
OUTER DIMENTIONS	See outline drawing											
ABSOLUTE MAXIMUM RATINGS				(2)		(10)			(3)	(4)		(5)
	Term	Ef	tk	ebm	Ib	ibm	Pi	σL	Tp	Tcase	Tstorage	Tseal
	Unit	V	s	kV	mAdc	A	kW	-	°C	°C	°C	°C
	Max	3.75	-	4.5	350	1.2	1.4	4	300	100	60	320
	Min	2.85	0	-	-	-	-	-	-	-	-30	-
STANDARD TEST CONDITION: (1)		3.3	5	-	300	-	-	1.1Max	-	-	-	-

TEST SPECIFICATIONS

TEST TERM (6)		TEST METHOD (EIAJ ED-1501)	TEST CONDITION	SYMBOL	BOGIE	LIMIT		UNIT
						Min	Max	
** Vibration		5.4.1		-	-	-	-	-
Breakdown Voltage		4.2	Et=10kVdc or 8kVac (rms)	-	-	-	-	-
Insulation		-	Et=1kVdc (7)	-	-	-	-	-
* Cold Start Voltage Transient		-	(8)	-	-	-	-	kV
* Filament Current		4.1.1	tk=120s	If	10.5	8.5	12.5	A
Peak Anode Voltge		4.3.1	(9)	ebm	4.20	4.05	4.40	kV
Average Output Power (1)		4.3.3.1	(9)	Po	900	860	940	W
* Average Output Power (2)		4.3.3.2	σL=4, Power Min (9)	Po	-	510	-	W
Frequency		4.3.4	(9)	f	2460	2450	2470	MHz
* Stability/Moding		4.3.11.2	σL=2,3,4	-	-	-	-	-
* Stability/Runaway		4.3.11.1	σL=6, t=30s					
* Pulling Factor		4.3.6	σL=2	fpl	-	-	26	MHz
* Sink Phase		4.3.7	σL=2	λsink /λg	0.200	-	-	-
** Life Test		4.5.1	(11)	t	-	500	-	h
** Life Test End Point	Average Output Power (1)	4.3.3.1	(9)	Po	-	680	-	W
	Stability/ Moding	4.3.11.2	σL=2,3,4	-	-	-	-	-
	Stability/ Runaway	4.3.11.1	σL=6, t=30s	-	-	-	-	-

MAGNETRON SPECIFICATION

Note (1) The tube shall be mounted on the output coupler (containing tapered waveguide) shown in the attached drawing (Page-4) and cooled by forced air of 800 ℓ/min. Single phase full wave rectifier without filter shall be used for power supply. The diagram of the test equipment is shown in the attached drawing (Page-3).

(2) During normal oscillation.

(3) The points for measuring anode temperature is shown in the outline drawing. Maximum anode temperature for normal condition (with load in the cavity) should be 250 °C

(4) The point for measuring filter case temperature is shown in the outline drawing.

(5) Tseal means temperature of ceramic-to-metal seal position of the tube. Maximum allowable build-up curve of seal temperature is shown in the attached drawing (Page-5).

(6) Tests shall be classified as follows:

Class	Mark †	Remarks
Production test	None	This test is intended to ensure if the production line is being processed in compliance with the standard, and shall be conducted on some typical characteristics which are considered to be affected by changes in the process.
Design test	*	This test is intended to ensure the standard design, and shall be conducted on such characteristics which are not affected by the ordinary production line as long as the design is maintained.
Type approval test	**	This test is intended to ensure the compliance of the standard design with given specifications, and may be omitted unless a substantial change in the design is made.

†: The Mark is placed on the left of each test item, for instance, **Vibration

(7) See the attached drawing (Page-5, Insulation).

(8) Measurement shall be conducted by standard oven which has a single phase half wave doubler power supply without filter, where no load voltage of the transformer shall be less than 2.2 kV rms. The voltage transient just before start of oscillation shall be measured.

(9) Measurement shall be conducted within 15 seconds after anode power is turned on. Magnetron is kept in the constant ambient temperature for more than 4 hours before testing. Standard ambient temperature is 25 °C. Correction factor of peak anode voltage (ebm) and output power (Po) vs. temperature is shown in the attached drawing (Page-5).

(10) For each oven model, both microwave oven manufacturer and Toshiba Hokuto should evaluate and agree on the stability characteristics in the design stage of the oven.

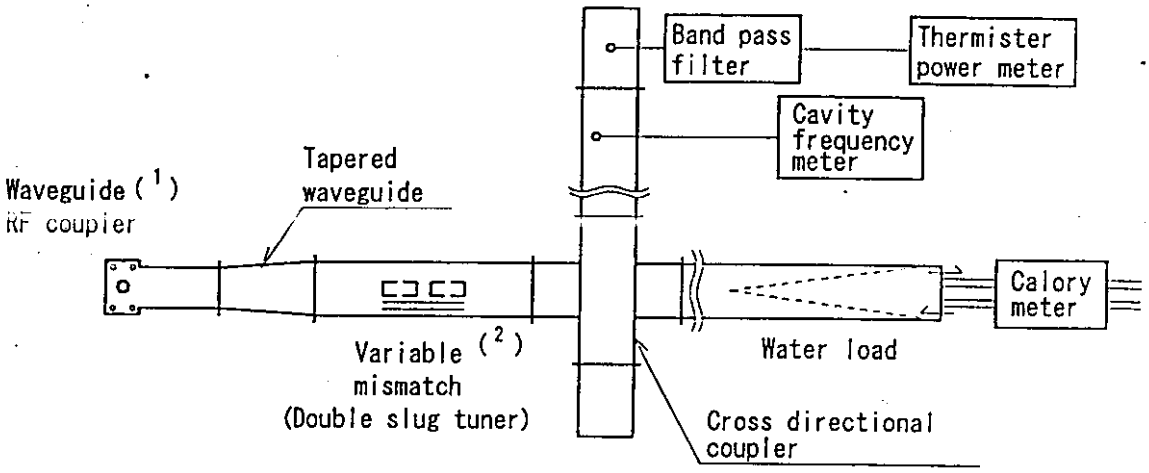
(11) The tube shall not appreciably be damaged in the following abnormal test.

Condition:

Anode temperature (Tp)	Cycle (Time)	Corresponding operating condition
350 °C MAX	5 cycles (15minutes/cycle)	No Load

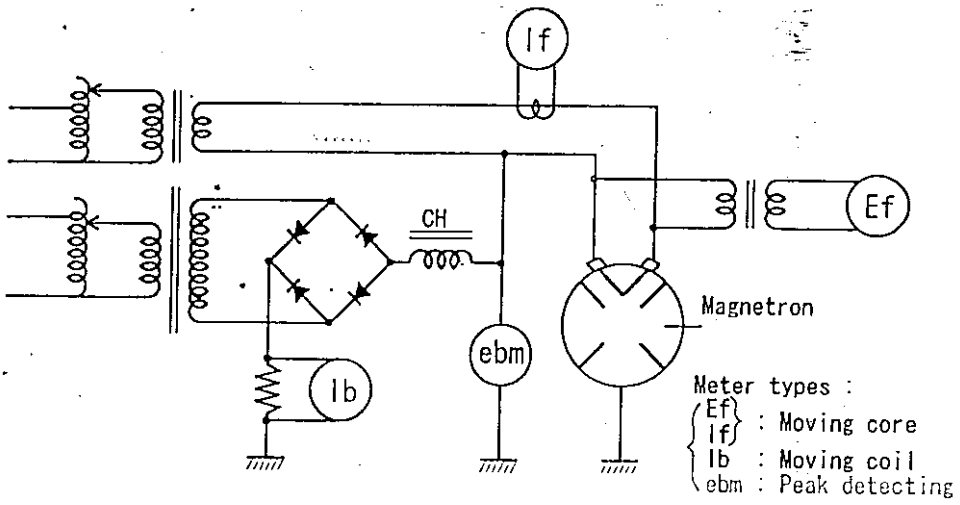
TEST EQUIPMENT

A. Waveguide configuration



Note
(1) Details are shown in the attached drawing (Page-4).
(2) Calibrated with the standard standing wave detector.
(3) WR430 waveguides are used from the double slug tuner to the water load.

B. Power supply connection



Note
(1) Choke coil is adjusted such that the peak anode current value becomes three times the average value.

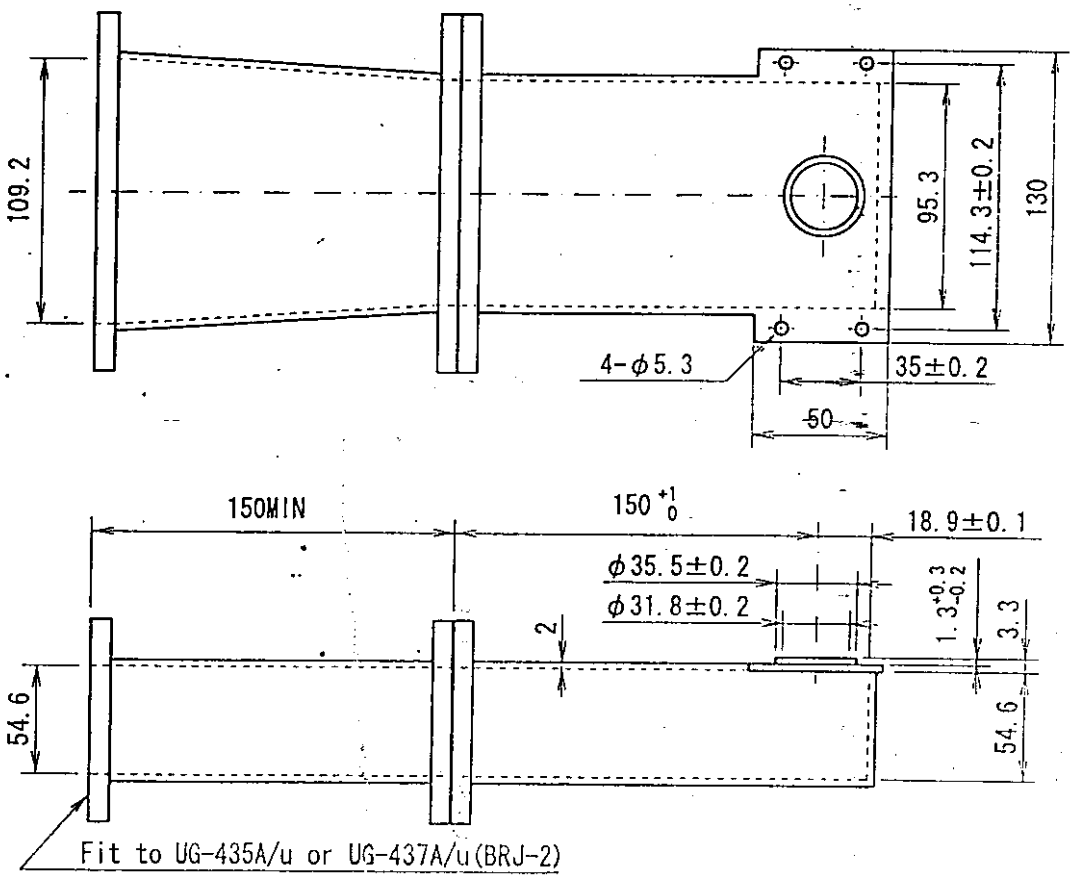
MAGNETRON SPECIFICATION

FILAMENT CONNECTION

To minimize possible transient voltage, the terminals (F) and (FA) should be connected to the transformer in such a way that the anode voltage increases and anode current decreases compared with those for reversed connection when a single phase half wave doubler without filter is used as a power supply.

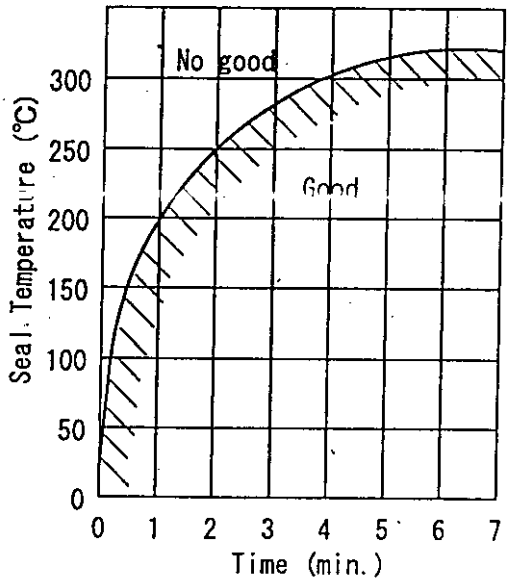
OUTPUT COUPLER (The output coupler used in Toshiba Hokuto inspection)

Unit : mm

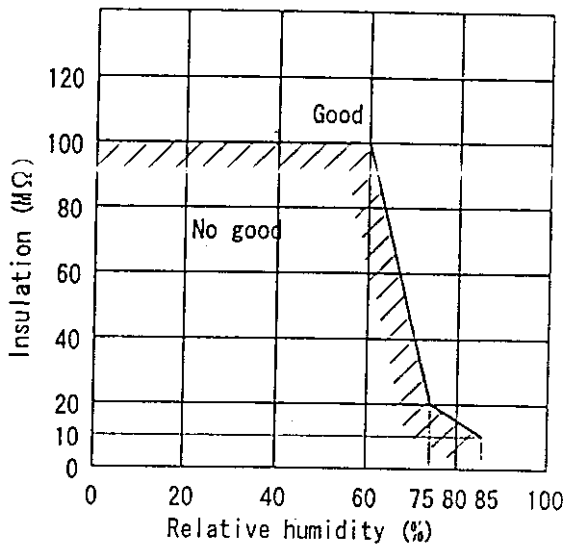


MAGNETRON SPECIFICATION

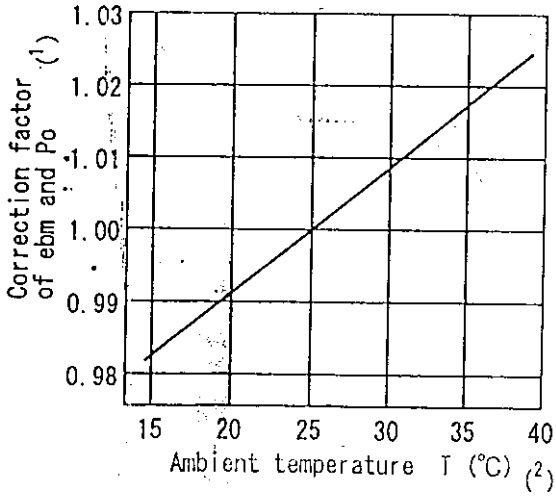
MAXIMUM ALLOWABLE BUILD-UP CURVE OF SEAL TEMPERATURE



INSULATION



CORRECTION FACTOR OF PEAK ANODE VOLTAGE (ebm) AND OUTPUT POWER (Po) VS. AMBIENT TEMPERATURE



Note

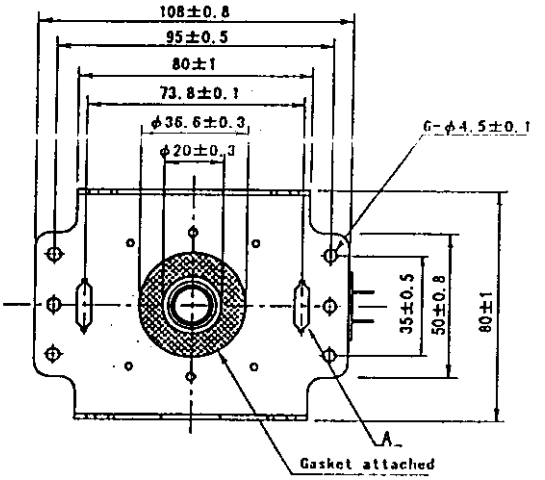
(1) ebm (or Po) measured at T °C × Correction factor at T °C = ebm (or Po) at 25 °C

(2) The temperature shown in this figure is the constant room temperature in which the magnetron has been kept for more than 4 hours before testing.

MAGNETRON SPECIFICATION

OUTLINE DRAWING (Made in JAPAN)

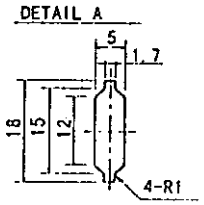
Unit : mm

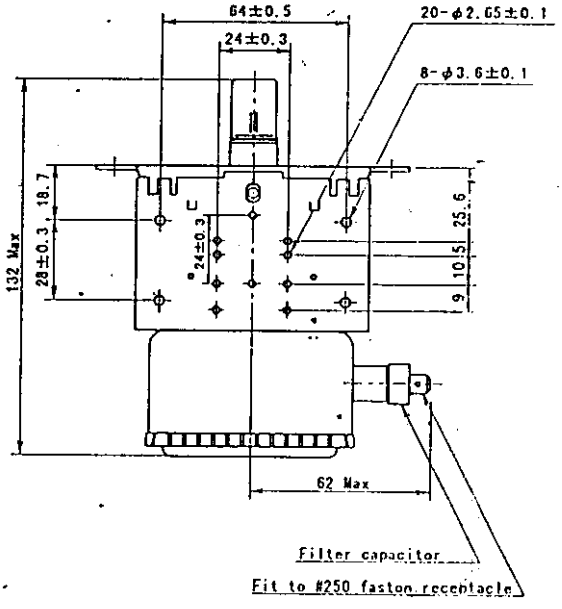


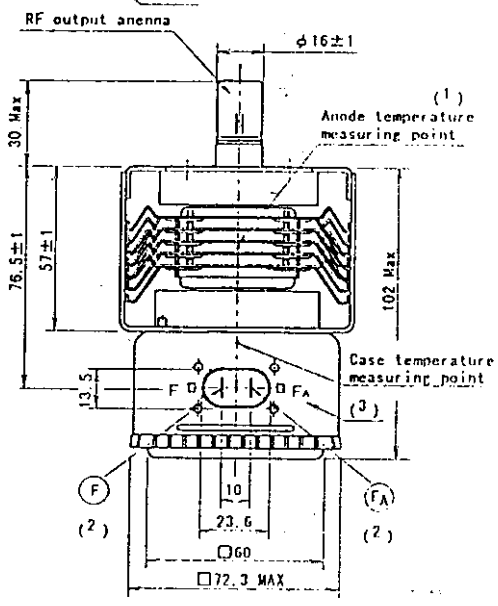
Note(1) Temperature to be measured at the outlet side of air flow.

(2) Refer filament connection.

(3) "F" and "FA" are marked at these positions.



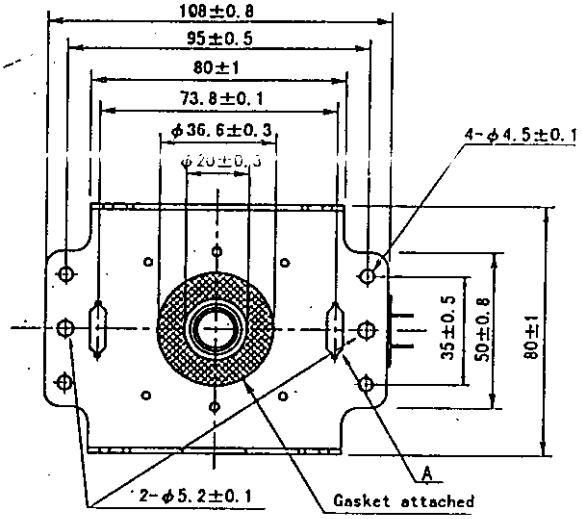




MAGNETRON SPECIFICATION

OUTLINE DRAWING (Made in UK)

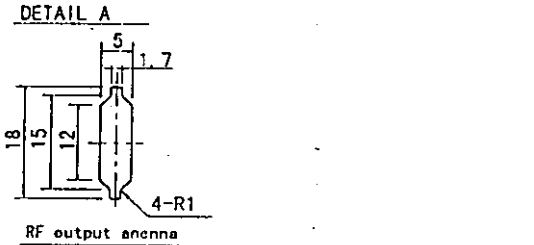
Unit : mm

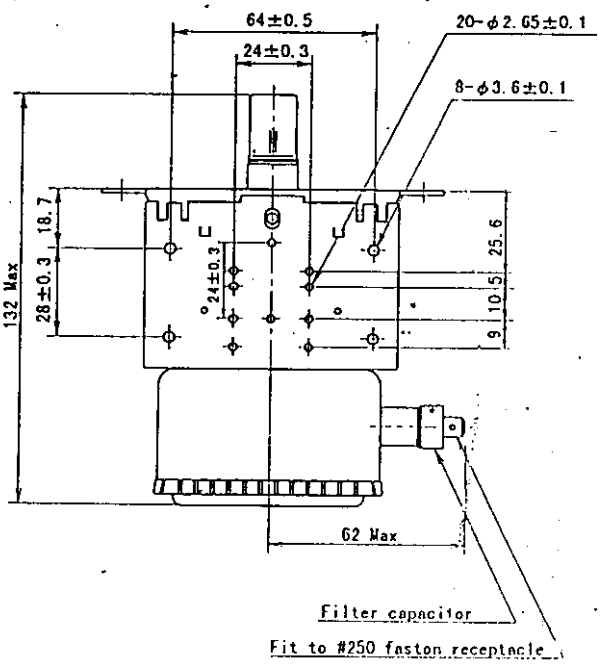


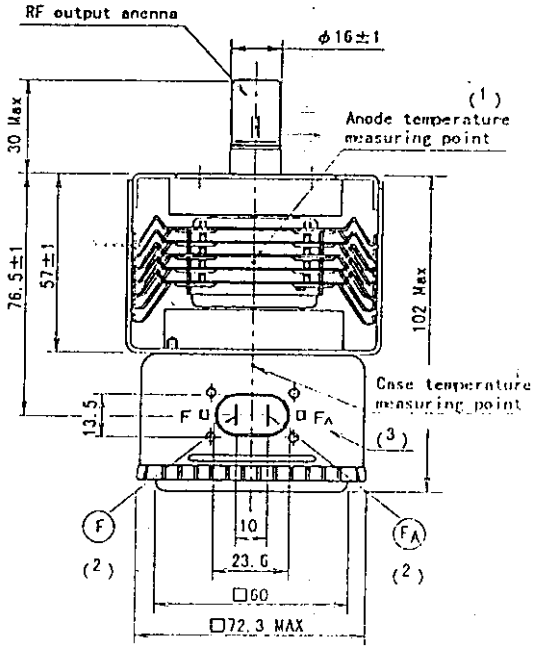
Note(1) Temperature to be measured at the outlet side of air flow.

(2) Refer filament connection.

(3) "F" and "FA" are marked at these positions.







MAGNETRON SPECIFICATION

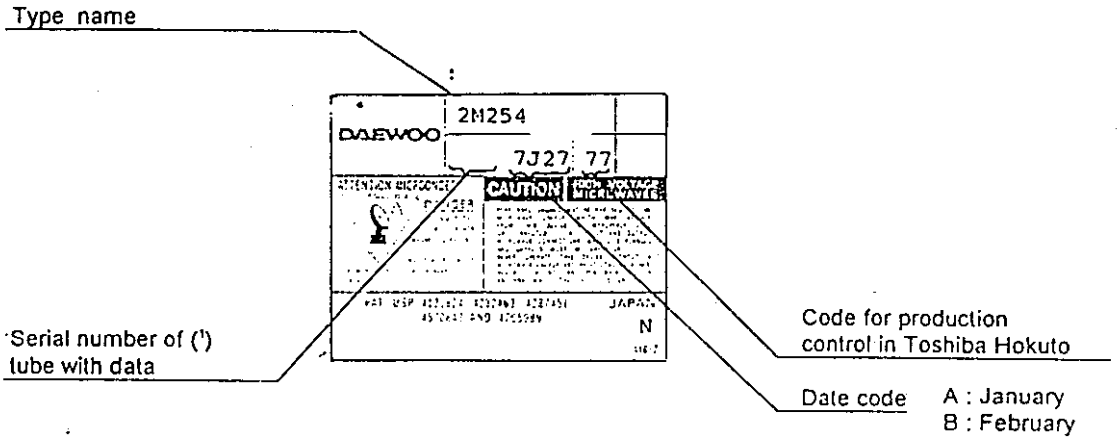
LABEL

The label as shown below shall be put on each tube.

The code stamped on the indicated position of each label consists of three block numbers ;

The first block is the serial number of tube with data. The second block is the date code in which the preceding one numerals shows the last of Christian Era and the continuing block letter and two numerals indicate the three months after the scheduled date of shipment from Japan or UK.

The third block is the numerals only for the production control in Toshiba Hokuto.

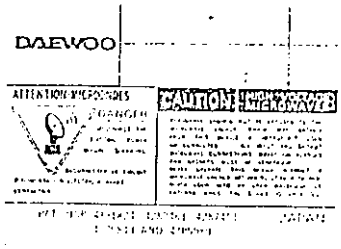


Note

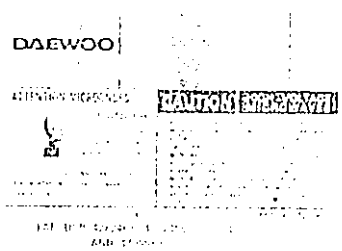
(') In case of a sample requirement only

Sample

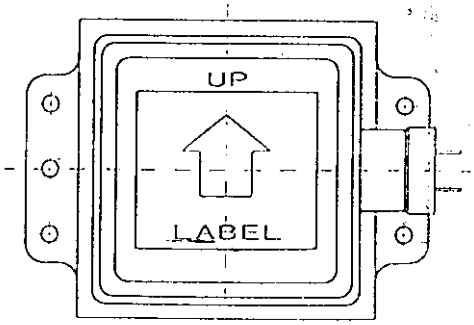
(Made in Japan)



(Made in UK)



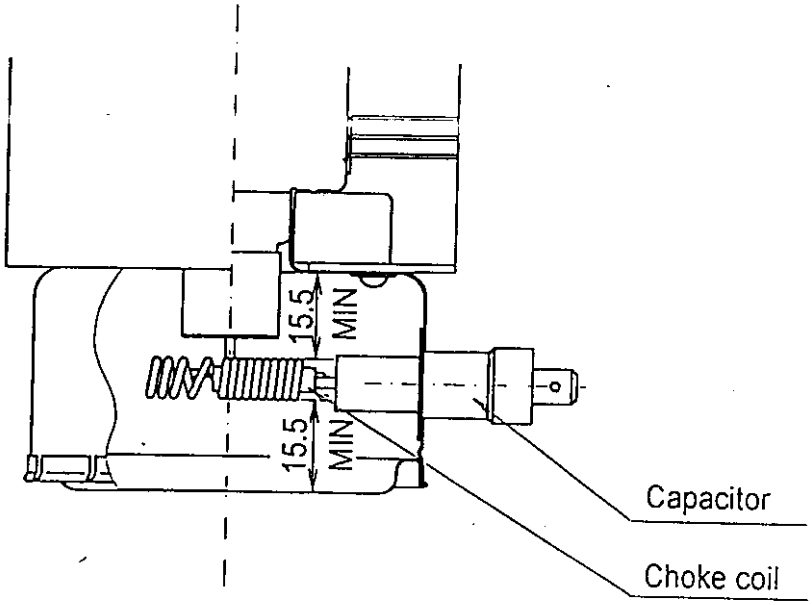
Labeling

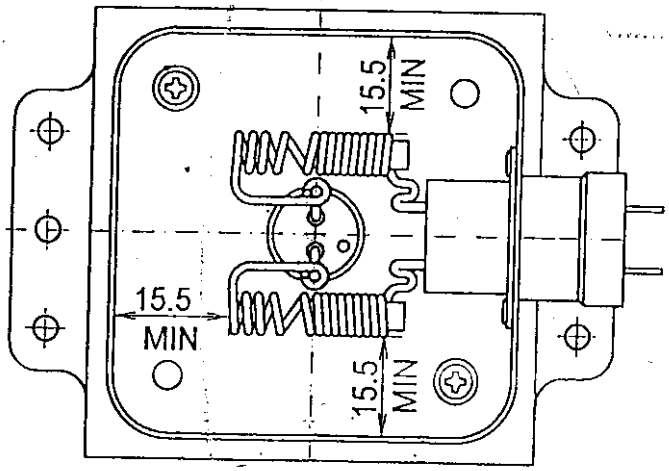


MAGNETRON SPECIFICATION

SPACING IN THE FILTER BOX

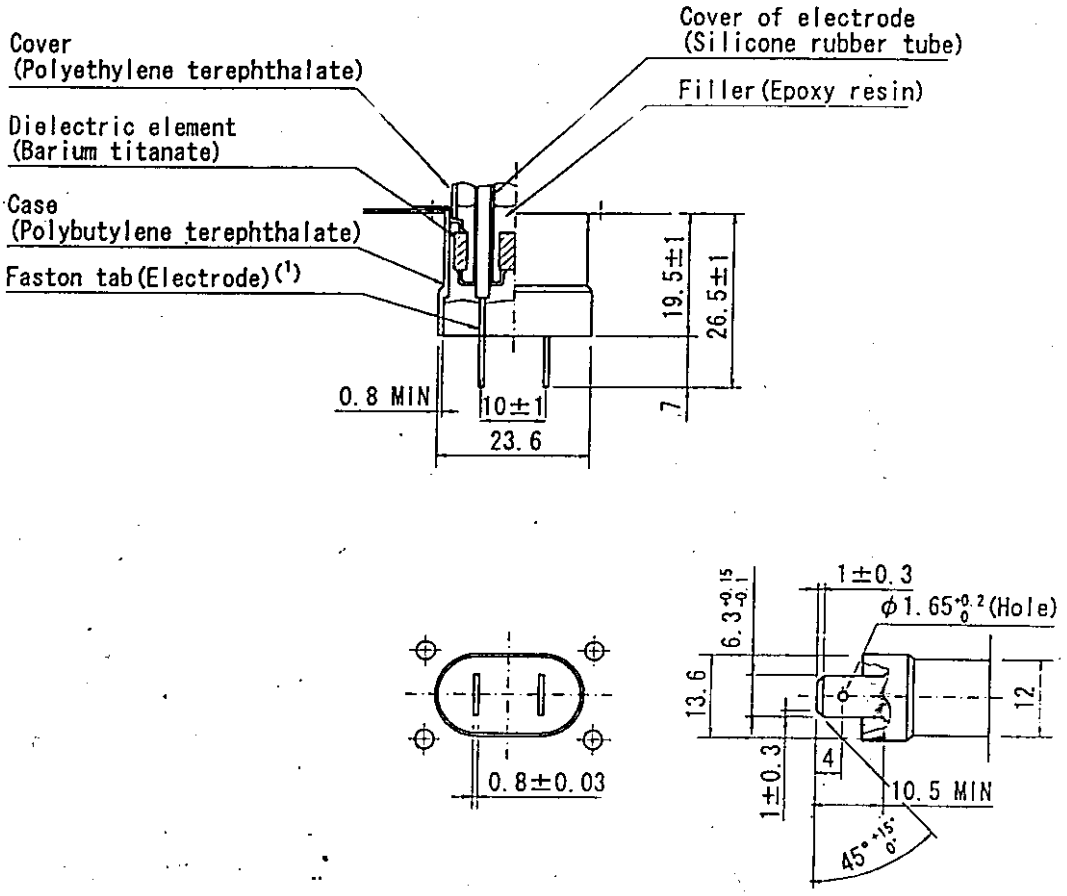
Unit : mm





DETAILS OF FILTER CAPACITOR

Unit : mm



Note

(1) The faston tab meets to BS 5057 ; 1973 and DIN 46 244 ; April 1980.

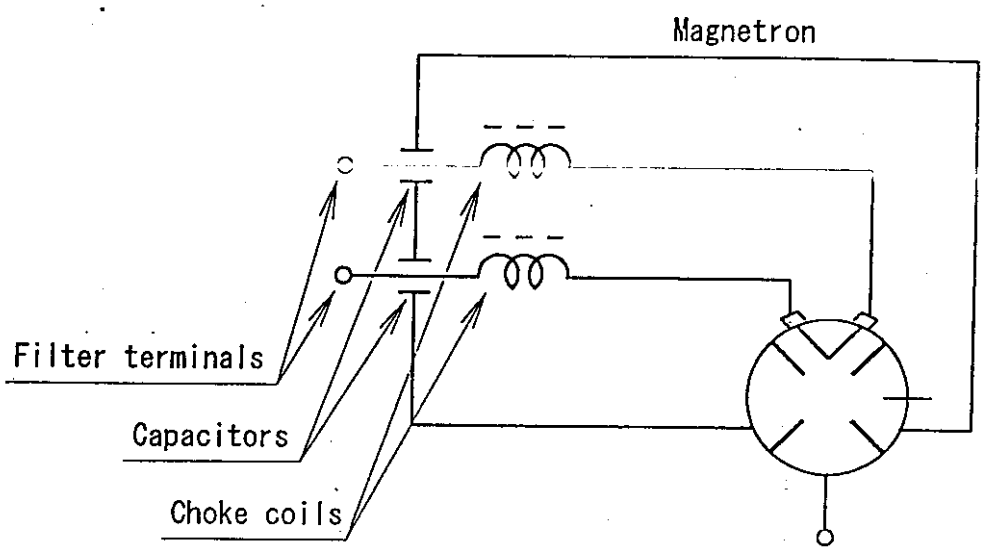
INSULATING MATERIAL (Refer Page-8 & 9)

Part Name	Catalog No./ Manufacturer (*)	Material	Manufacturer of Materials	UL No. (1)		
				Guide No.	File No.	Grade No.
Capacitor	Toshiba Hokuto Spec. HFC-2L-3/ TDK Corp.	Barium Titanate	TDK Corp.	-	-	-
		Epoxy Resin	Ditto	-	-	-
		Silicone Rubber Tube	Shin-etsu Chemical Co., Ltd. or Toshiba Silicone Co., Ltd.	-	-	-
		Polyethylene Terephthalate	Teijin Ltd.	QMF-Z2	E52857M	CN9015
		Polybutylene Terephthalate	Mitsubishi Rayon Co., Ltd.	QMF-Z2	E54695M	G2930
Choke coil	Toshiba Hokuto Spec. Marusan Corporation. or Kokusan Bane Co., Ltd.	Ferrite	Tomita Electric Co., Ltd. or Hitachi Ferrite Co., Ltd. or Fuji Denki Kagaku Co., Ltd. or NWE Industrial Co., Ltd.	-	-	-
		Formal Coated Wire	Daiichi Denko Co., Ltd. or Showa Electric Wire & Cable Co., Ltd. or TAI-I Electric Wire & Cable Co.,Ltd.	-	-	-
		Silicone Rubber	Toshiba Silicone Co., Ltd.	-	-	-

Note
(1) UL No. is for the material.
(*) One of them shall be used by Toshiba Hokuto's option.

MAGNETRON SPECIFICATION

FILTER CIRCUIT



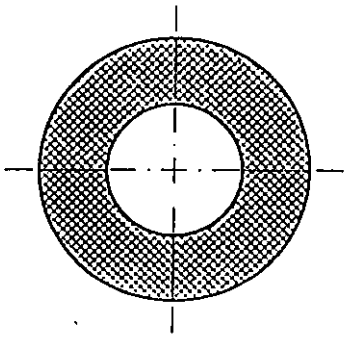
RATING

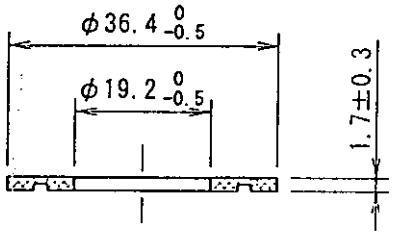
	Nominal value	Remarks
Capacitor	500pF×2 WV 10kVdc	-
Choke coil (13.5 turns)	1.2μH×2	at about 8MHz

GASKET

Unit : mm

Material : Woven and press formed brass wire





Inspection : By using thick part of slide calipers

MAGNETRON SPECIFICATION

PRECAUTIONS FOR SAFETY

Carefully take the following precautions for safety in using the magnetrons for microwave ovens or for other applications.
Magnetrons must be handled by individuals possessing adequate backgrounds of electrical, electronic, microwave and mechanical experience.
Toshiba Hokuto Electronics Corporation cannot be responsible for the interpretation of this information, nor can it be assumed any liability in connection with its use.

1. High Voltage
   Since the magnetron is operated with negative high potential at the cathode terminals, a special care must be taken as follows.
   1-1 Do not touch nor come close to the cathode terminals or their surroundings during operation.
   1-2 To avoid shock hazards, never insert metallic wire or like into the filter box, and never operate the magnetron with the lid of filter box open.
   1-3 Before removing the magnetron from the oven, carefully check that power is turned off, and discharge the cathode terminal or the capacitors in the power supply circuit by using the discharging rod adequately designed for safety.

2. Radiation Leakage
   Care should be taken for radiation leaked from the magnetron, though the leakage from the input part of magnetron is restricted to a level which human body is not adversely affected.
   2-1 Properly install and tightly fasten the magnetron in the oven or in the waveguide coupler.
   2-2 Do not deform the gasket or do not operate the magnetron with the gasket removed, to avoid hazardous conditions such as radiation leakage and arcing.
   2-3 Never operate the magnetron without installing it in the over or with the output antenna exposed.
   2-4 Do not remove the lid of the filter box nor deform the filter box.
   2-5 Always keep your eyes apart from the operating magnetron in consideration of the unexpected hazardous conditions.

3. Temperature
   Although the magnetron is subjected to forced air cooling during operation, high temperature (sometimes more than 200 °C) is observed on the enclosure of magnetron. Care should be taken as follows.
   3-1 Do not touch the magnetron immediately after turning power off. Allow the magnetron to cool before handling.
   3-2 Putting on cotton gloves or the equivalents is recommended for safe handling.

4. Alteration
   Do not alter the magnetron.

MAGNETRON SPECIFICATION

Factories

(1) Toshiba Hokuto Electronics Corporation
23-chome 1975, Minami 5-jo, Asahikawa, 078, Japan
Phone : (0166) 31-4728
Facsimile : (0166) 35-5671

(2) Toshiba Consumer Products (U.K.) Ltd.,
Northholt Avenue. Emessettle, Plymouth, Devon, England, PL5 2TS
Phone : (01752) 208549
Facsimile : (01752) 205270

MAGNETRON SPECIFICATION

RECORD OF REVISION

Original Specification : E960014-D01 January 24, 1996

STATUS	PAGE	REVISION	NOTES	EFFECTIVE DATE
Revision A	7	LABEL Change of Label	As per Daewoo's request	February 28, 1996
Revision B	6	Addition of holes for mounting thermoswitch	As per Toshiba Hokuto's request	June 21, 1996
		Length from antena top to filter box lid 131MAX → 132MAX	Correction	
		Length from york to filter box lid 101MAX → 102MAX		
Revision C	1	TEST CONDITION of Average Output Power(1) Bogie ; 890→ 900 , Min ; 850→ 860 Max ; 930→ 940	Correction	July 17, 1997
	7	LABEL Addition of Label made in UK	As per Daewoo's request	
	14	Addition of factories	As per Daewoo's request	
Revision D	2	Change of LIFE TEST CONDITION 320°C MAX → 350°C MAX	As per Toshiba Hokuto's request	July, 1998
	6	Change of title Outline drawing (Made in Japan)	Change of hole size (made in UK only)	
	6-1	Addition of page Outline drawing (Made in UK)		
	~~——~~	~~Change of page~~	~~Due to addition of page~~	

TOSHIBA

TOSHIBA HOKUTO ELECTRONICS CORPORATION
MAGNETRON ENGINEERING DEPARTMENT
1975, 23-CHOME, MINAMI 5-JODORI, ASAHIKAWA, HOKKAIDO 078, JAPAN
PHONE: (0166) 31-4728 FACSIMILE: (0166) 35-5671

To: DAEWOO ELECTRONICS CO., LTD.

APPROVAL SIGNATURE

SPECIFICATION

FOR

MAGNETRON

2M248

H. Saito

Hisao Saito
SENIOR MANAGER,
MAGNETRON ENGINEERING DEPARTMENT

SPECIFICATION NUMBER : E06007-D01 April 14, 1994
REVISION STATUS :

MAGNETRON SPECIFICATION

TENTA

This specification is based on the testing methods for continuous wave magnetrons ED-1501 set by the Electronic Industries Association of Japan (EIAJ).

Continuous Wave Magnetron												
DESCRIPTION	Magnetron (Fixed Frequency, Integral Magnet, Forced Air Cooled)											
FUNCTION	2450 MHz band continuous wave oscillation											
OUTER DIMENSIONS	See outline drawing											
ABSOLUTE MAXIMUM RATINGS	Term	Ef	tk	(2) ebm	Ib	(10) ibm	Pi	σL	(3) Tp	(4) Tcase	Tstorage	(5) Tseal
	Unit	V	s	kV	mAdc	A	kW	-	°C	°C	°C	°C
	Max	3.60	-	4.85	380	1.5	1.7	4	300	100	60	320
	Min	2.70	0	-	-	-	-	-	-	-	30	-
STANDARD TEST CONDITION: (1)		3.15	5	-	330	-	-	1.1Max	-	-	-	-

TEST SPECIFICATIONS

	TEST TERM (6)		TEST METHOD (EIAJ ED-1501)	TEST CONDITION	SYMBOL	BOGIE	LIMIT Min	LIMIT Max	UNIT
**	Vibration		5.4.1		-	-	-	-	-
	Breakdown Voltage		4.2	Et=10kVdc or 8kVac (rms)(11)	-	-	-	-	-
	Insulation		-	Et=1kVdc (7)	-	-	-	-	-
*	Cold Start Voltage Transient		-	(8)	-	-	-	8.5	kV
*	Filament Current		4.1.1	tk=120s	If	10.0	8.0	12.0	A
	Peak Anode Voltage		4.3.1	(9)	ebm	4.35	4.15	4.55	kV
	Average Output Power (1)		4.3.3.1	(9)	Po	1020	970	1070	W
*	Average Output Power (2)		4.3.3.2	σL=4, Power Min (9)	Po	-	540	-	W
	Frequency		4.3.4	(9)	f	2460	2450	2470	MHz
*	Stability/Moding (1)		4.3.11.2	σL=2,3,4	-	-	-	-	-
	Stability/Moding (2)		4.3.11.2	σL=3, ibm=0.85A t=15s	-	-	-	-	-
*	Stability/Runaway		4.3.11.1	σL=6, t=30s					
*	Pulling Factor		4.3.6	σL=2	fpl	-	-	21	MHz
*	Sink Phase		4.3.7	σL=2	λsink /λg	0.235	-	-	-
**	Life Test		4.5.1		t	-	500	-	h
**	Life Test End Point	Average Output Power (1)	4.3.3.1	(9)	Po	-	770	-	W
		Stability/ Moding	4.3.11.2	σL=2,3,4	-	-	-	-	-
		Stability/ Runaway	4.3.11.1	σL=6, t=30s	-	-	-	-	-

Note

(1) The tube shall be mounted on the output coupler (containing tapered waveguide) shown in the attached drawing (Page-5) and cooled by forced air of 800ℓ/min. Single phase full wave rectifier without filter shall be used for power supply. The diagram of the test equipment is shown in the attached drawing (Page-4).

(2) During normal oscillation.

(3) The point for measuring anode temperature is shown in the outline drawing. Maximum anode temperature for normal condition (with load in the cavity) should be 250 °C.

(4) The point for measuring filter case temperature is shown in the outline drawing.

(5) Tseal means temperature of ceramic-to-metal seal position of the tube. Maximum allowable build-up curve of seal temperature is shown in the attached drawing (Page-6).

(6) Tests shall be classified as follows:

Class	Mark†	Remarks
Production test	None	This test is intended to ensure if the production line is being processed in compliance with the standard, and shall be conducted on some typical characteristics which are considered to be affected by changes in the process.
Design test	*	This test is intended to ensure the standard design, and shall be conducted on such characteristics which are not affected by the ordinary production line as long as the design is maintained.
Type approval test	**	This test is intended to ensure the compliance of the standard design with given specifications, and may be omitted unless a substaintial change in the design is made.

† : The mark is placed on the left of each test item, for instance,
* Insulation.

(7) See the attached drawing (Page-6, Insulation).

(8) Measurement shall be conducted by standard oven which has a single phase half wave doubler power supply without filter, where no load voltage of the transformer shall be less than 2.2 kV rms. The voltage transient just before start of oscillation shall be measured.

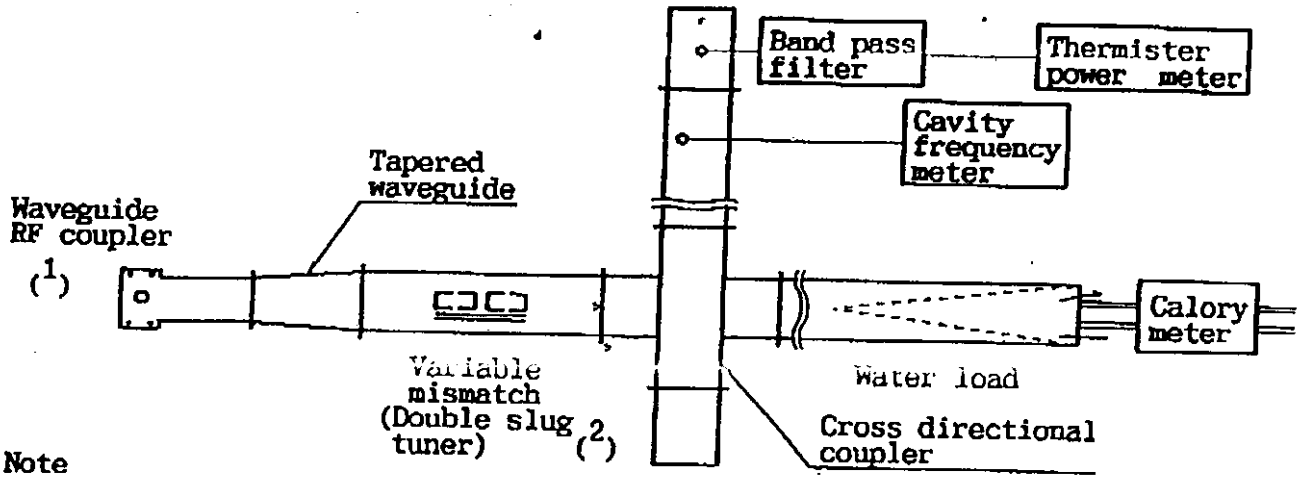
(9) Measurement shall be conducted within 15 seconds after anode power is turned on. Magnetron is kept in the constant ambient temperature for more than 4 hours before testing. Standard ambient temperature is 25 °C. Correction factor of peak anode voltage (ebm) and output power (Po) vs. temperature is shown in the attached drawing (Page-6).

(10) For each oven model, both microwave oven manufacturer and Toshiba Hokuto should evaluate and agree on the stability characteristics in the design stage of the oven.

MAGNETRON SPECIFICATION

TEST EQUIPMENT

A. Waveguide configuration



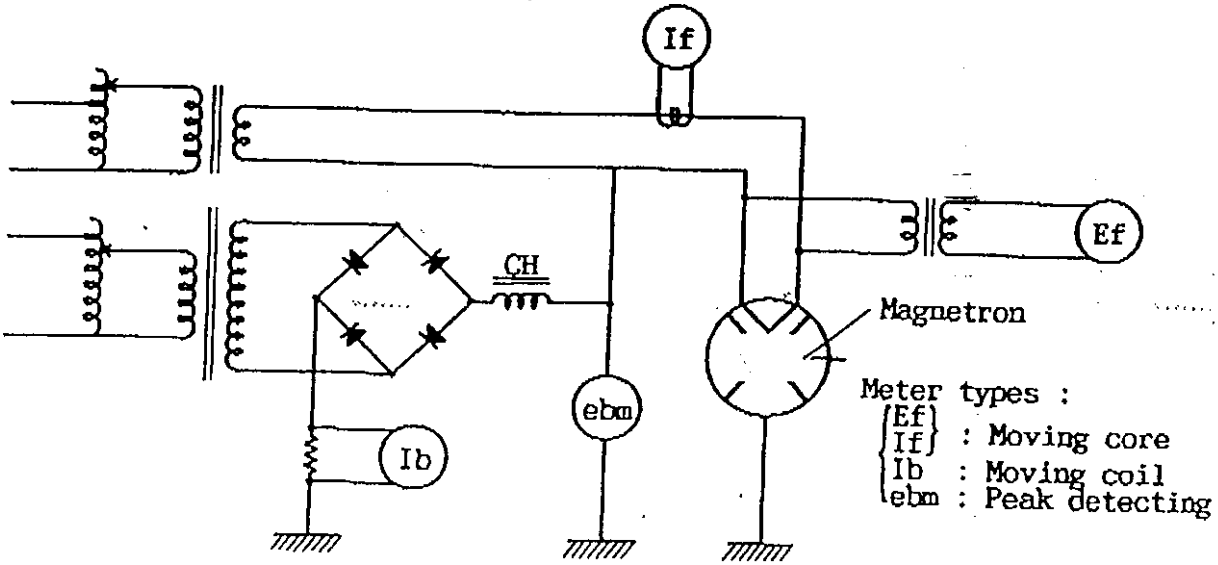
Note

(1) Details are shown in the attached drawing (page-5).

(2) Calibrated with the standard standing wave detector.

(3) WR430 waveguides are used from the double slug tuner to the water load.

B. Power supply connection



Note

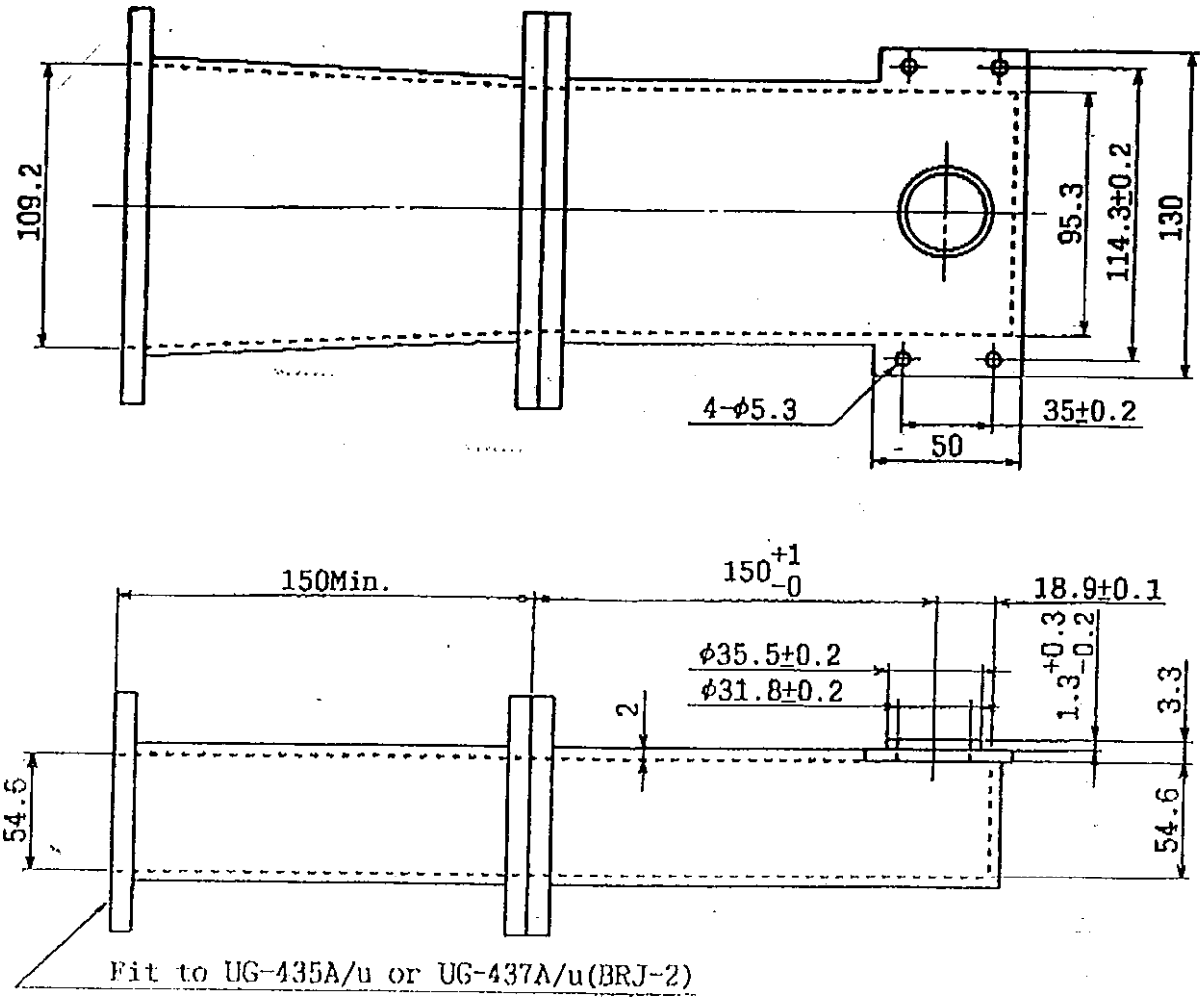
(1) Choke coil is adjusted such that the peak anode current value becomes three times the average value.

FILAMENT CONNECTION

To minimize possible transient voltages, the terminals (F) and (FA) should be connected to the transformer in such a way that the anode voltage increases and anode current decreases compared with those for reversed connection when a single phase half wave doubler without filter is used as a power supply.

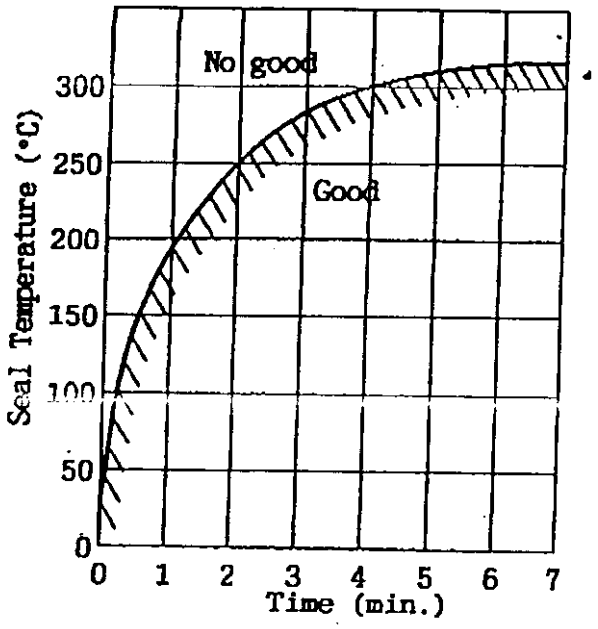
OUTPUT COUPLER (The output coupler used in Toshiba Hokuto inspection)

Unit : mm

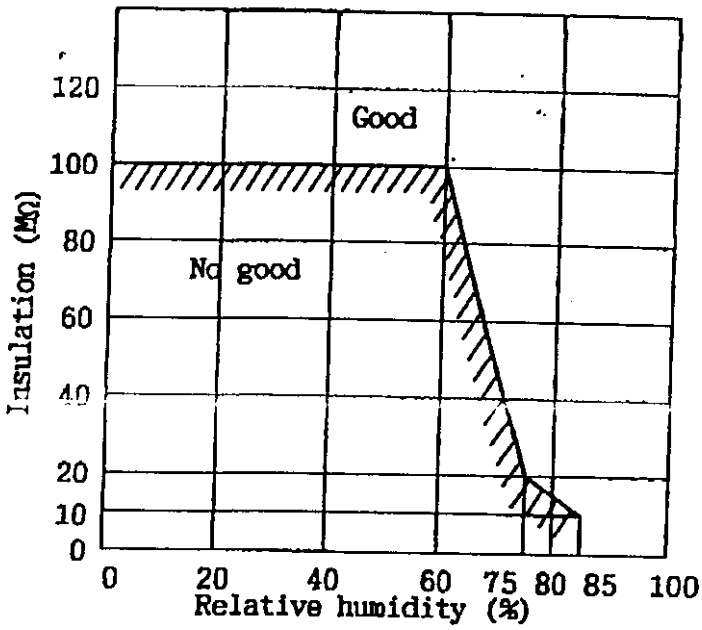


MAGNETRON SPECIFICATION

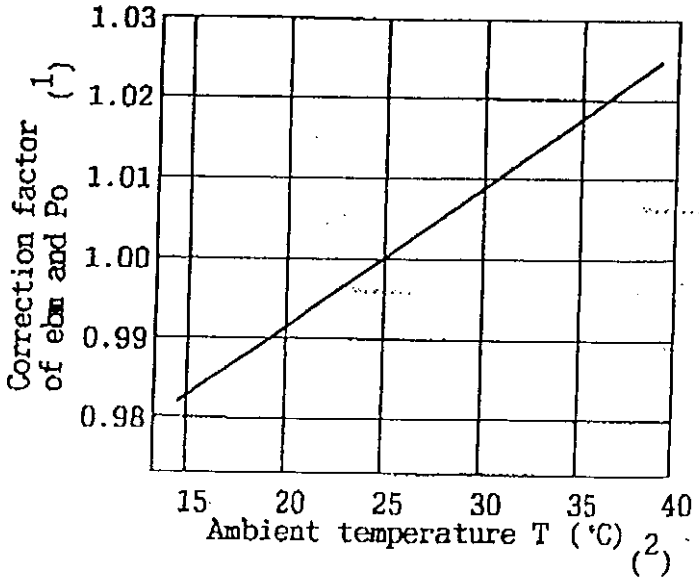
MAXIMAUM ALLOWABLE BUILD-UP CURVE OF SEAL TEMPERATURE



INSULATION



CORRECTION FACTOR OF PEAK ANODE VOLTAGE(ebm) AND OUTPUT POWER(Po) VS. AMBIENT TEMPERATURE



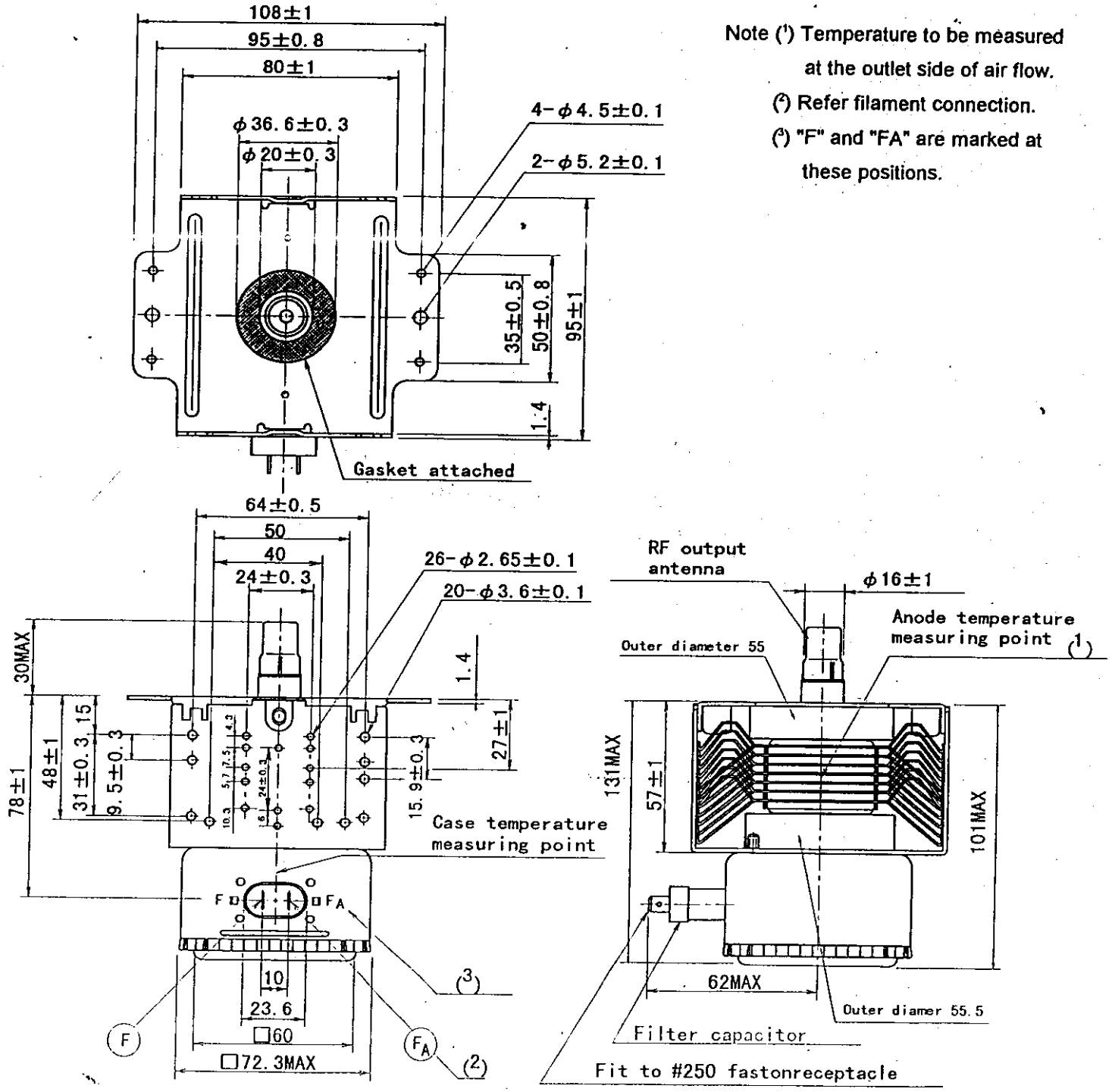
Note

(1) $\begin{pmatrix}\text{ebm(or Po)}\\ \text{measured}\\ \text{at T °C}\end{pmatrix} \times \begin{pmatrix}\text{Correction}\\ \text{factor}\\ \text{at T °C}\end{pmatrix} = \begin{pmatrix}\text{ebm or Po}\\ \text{at 25 °C}\end{pmatrix}$

(2) The temperature shown in this figure is the constant room temperature in which the magnetron has been kept for more than 4 hours before testing.

OUTLINE DRAWING

Unit : mm



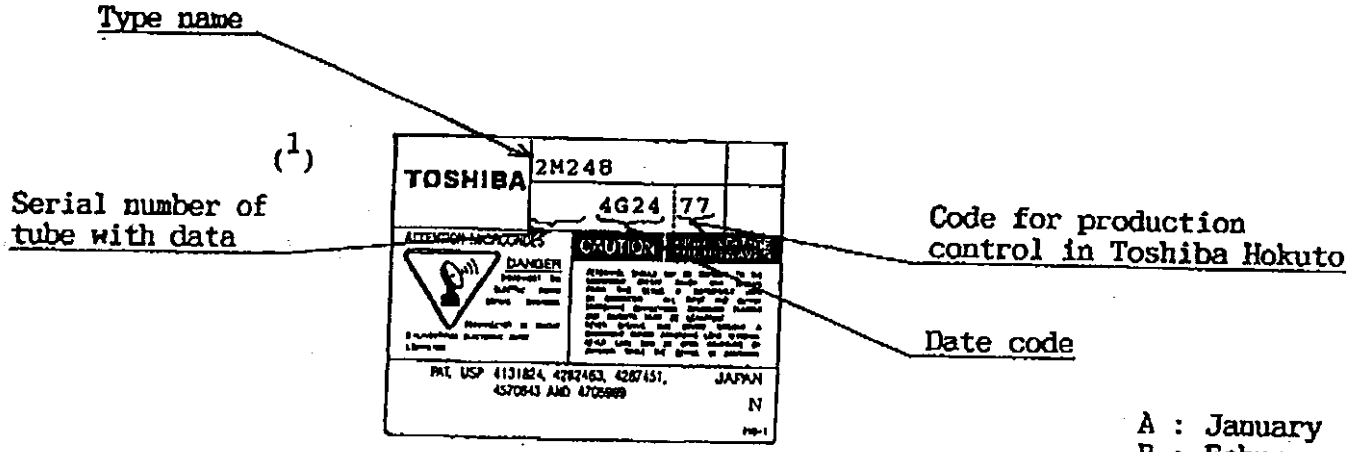
Note (1) Temperature to be measured at the outlet side of air flow.

(2) Refer filament connection.

(3) "F" and "FA" are marked at these positions.

LABEL

The label as shown below shall be put on each tube.
The code stamped on the indicated position of each label consists of three block numbers: The first block is the serial number of tube with data. The second block is the date code in which the preceding one numerals shows the last of Christian Era and the continuing block letter and two numerals indicate the three months after the scheduled date of shipment from Japan. The third block is the numerals only for the production control in Toshiba Hokuto.

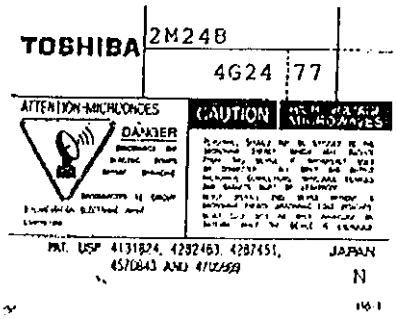


A : January
B : February
C : March
D : April
E : May
F : June
G : July
H : August
J : September
K : October
L : November
M : December

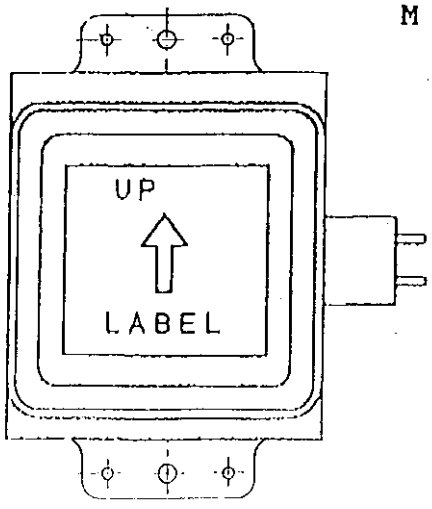
Note .....

(1) In case of a sample requirement only .....

Sample



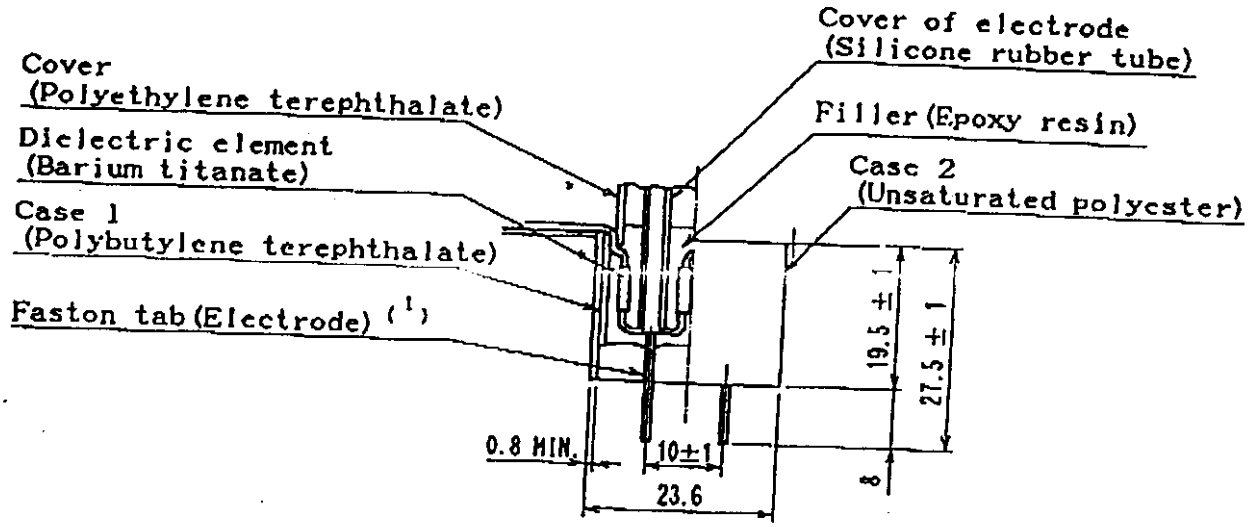
Labeling

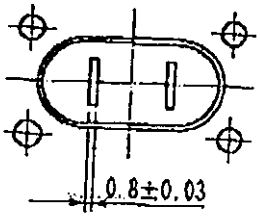


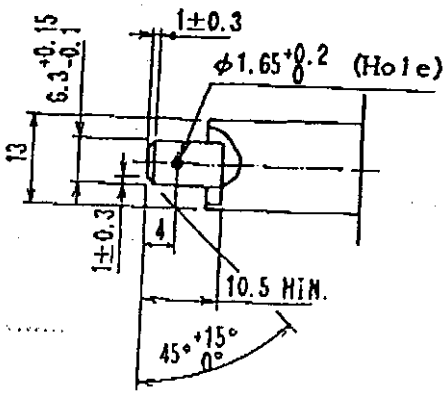
MAGNETRON SPECIFICATION

Catalog number : HFC-2L-1

Unit : mm



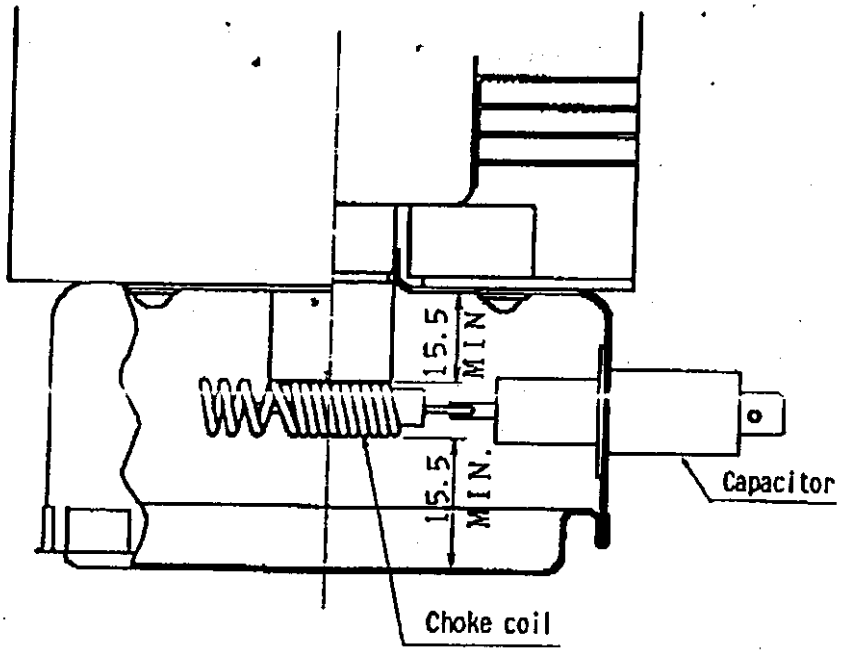


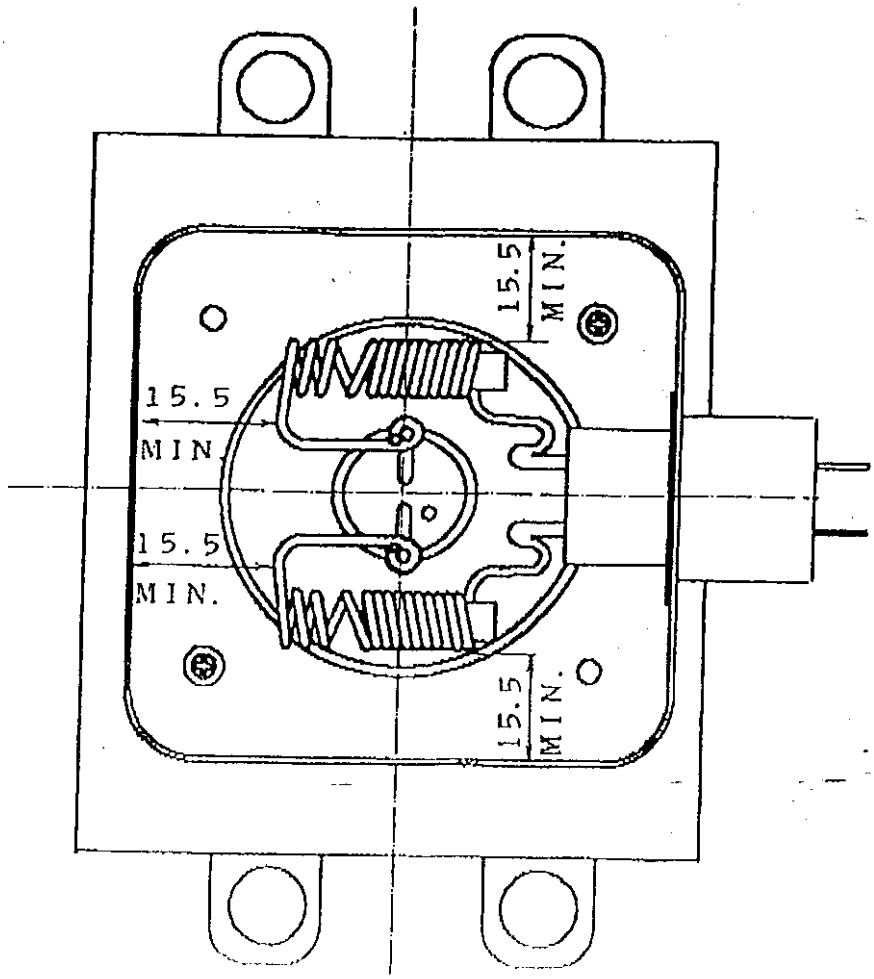


Note (1) The faston tab meets to BS 5057:1973 and DIN 46 244:April 1980

MAGNETRON SPECIFICATION

Unit : mm





MAGNETRON SPECIFICATION

INSULATING MATERIAL (Refer Page-8 & 9)

Part Name	Catalog No./ Manufacturer (2)	Material	Manufacturer of Materials	UL No. (1)		
				Guide No.	File No.	Grade No.
Capacitor	Toshiba Hokuto Spec. HFC-2L-1/ TDK Corp.	Barium Titanate	TDK Corp.	-	-	-
		Epoxy Resin	, Ditto	-	-	-
		Silicone Rubber Tube	Shin-etsu Chemical Co.,Ltd.	-	-	-
		Polyethylene terephthalate	Teijin Ltd.	QMF-Z2	E52857M	CN9015
		Polybutylene terephthalate	Poly Plastics Co.,Ltd.	QMF-Z2	E45034M	2082
		Unsaturated polyester	Matsushita Electric Works Ltd.	QMF-Z2	E41404S	CE5100
Choke coil	Toshiba Hokuto Spec. / Kokusan Bane Co.,Ltd. or Hirose Spring Factory Corporation	Ferrite	Tomita Electric Co.,Ltd. HITACHI Ferrite Co.,Ltd. or Fuji Denki Kagaku Co.,Ltd.	-	-	-
		Formal Coated Wire	Daiichi Denko Co.,Ltd. or Showa Electric Wire & Cable Co.,Ltd.	-	-	-
		Silicone Rubber	Toshiba Silicorne Co.,Ltd.	-	-	-

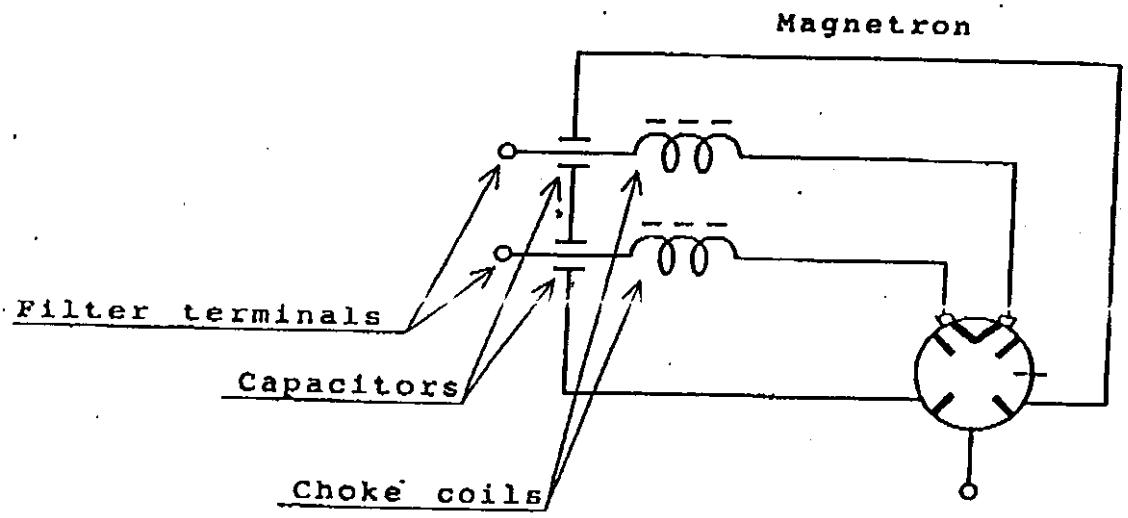
Note

(1) UL No. is for the material.

(2) One of them shall be used by Toshiba Hokuto's option.

MAGNETRON SPECIFICATION

FILTER CIRCUIT



RATING

	Nominal Value	Remarks
Capacitor	500 pF × 2 WV 10kVdc	——
Choke Coil (13.5 turns)	1.2 μH × 2	at about 8 MHz

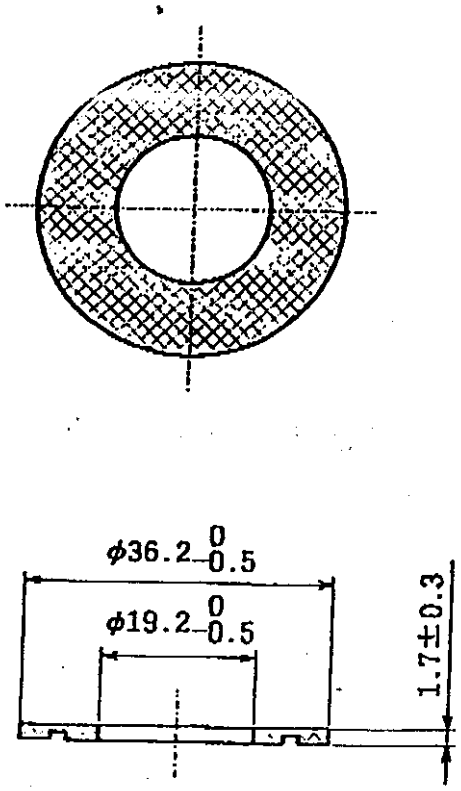
MAGNETRON SPECIFICATION

GASKET

Unit: mm

Toshiba part No. : 3331-816C

Material : Woven and press formed brass wire



Inspection : By using thick part of slide calipers

MAGNETRON SPECIFICATION

PRECAUTIONS FOR SAFETY

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1. High Voltage

Since the magnetron is operated with negative high potential at the cathode terminals, a special care must be taken as follows.

1-1 Do not touch nor come close to the cathode terminals or their surroundings during operation.

1-2 To avoid shock hazards, never insert metallic wire or like into the filter box, and never operate the magnetron with the lid of filter box open.

1-3 Before removing the magnetron from the oven, carefully check that power is turned off, and discharge the cathode terminal or the capacitors in the power supply circuit by using the discharging rod adequately designed for safety.

2. Radiation Leakage

Care should be taken for radiation leaked from the magnetron, though the leakage from the input part of magnetron is restricted to a level which human body is not adversely affected.

2-1 Properly install and tightly fasten the magnetron in the oven or in the waveguide coupler.

2-2 Do not deform the gasket or do not operate the magnetron with the gasket removed, to avoid hazardous conditions such as radiation leakage and arcing.

2-3 Never operate the magnetron without installing it in the oven or with the output antenna exposed.

2-4 Do not remove the lid of the filter box nor deform the filter box.

2-5 Always keep your eyes apart from the operating magnetron in consideration of the unexpected hazardous conditions.

3. Temperature

Although the magnetron is subjected to forced air cooling during operation, high temperature (sometimes more than 200℃) is observed on the enclosure of magnetron. Care should be taken as follows.

3-1 Do not touch the magnetron immediately after turning power off. Allow the magnetron to cool before handling.

3-2 Putting on cotton gloves or the equivalents is recommended for safe handling.

MAGNETRON SPECIFICATION

RECORD OF REVISION

A) Original Specification: E06007-D01 April 14, 1994

STATUS & DATE	PAGE	REVISION	NOTES